

THE DEVELOPMENT OF A WEB BASED DATABASE APPLICATIONS OF PROCUREMENT, INVENTORY, AND SALES AT PT. INTERJAYA SURYA MEGAH

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Abstract: The objective of this research is to develop a web based database application for the procurement, inventory and sales at PT. Interjaya Surya Megah. The current system at PT. Interjaya Surya Megah is running manually, so the company has difficulty in carrying out its activities. The methodology, that is used in this research, includes interviews, observation, literature review, conceptual database design, logical database design and physical database design. The results are the establishment of a web-based database application at PT. Interjaya Surya Megah. The conclusion is the company can be easier to run the day-to-day activities because data processing becomes faster and more accurate, faster report generation and more accurate, more secure data storage.

Keywords: database; application; procurement; inventory; sales

INTRODUCTION

With the development of information technology nowadays, the need of a fast and accurate supporting process already becomes a common need. Information technology has opened opportunities for every company to be able to increase the performance. However, there are still several companies that run its activities manually. There are several problems faced while using that manual system, either related to data process, data storage, or data integration. Database technology, as one part of information technology, can help companies to solve the problem. Database is a data collection that logically connects to each other and also the description of the data; it is designed to fulfill the need of information from an organization [1]. Meanwhile, according to Ref. [2], database is a collection of data that are organized and logically related.

PT. Interjaya Surya Megah is a company in the field of sparepart machine sales, includes dynamo motor, gearbox, and power generator. At PT. Interjaya Surya Megah, the making of reports are still done manually, so error data input still happens, includes error units, prices, and inventory inputs that are still not accurate, caused by the error of the records, losing data that caused by neglecting the storage, data searching, that is not efficient, causing the report should be re-done, and the report is not appropriate in the end. The activities of sales and procurement are atill using manual system, by interacting face to face between the buyer and the seller, which is not effective, especially for the buyers from out of the

town. The making of the report takes a very long time because the data should be submitted manually from the related unit to be processed again and to be provided into the required format. The data, saved in physical files, are at risk to be quickly broken. The safety of data that is difficult to be controlled, because the access is easy for physical document by the party who is unauthenticated. According to Ref. [3], procurement is an attempt in a company for the procurement of goods, needed by the company.

With the background, PT. Interjaya Surya Megah has to change the process, which is until now still done manually, to be the process, supported by web based database application, which provides facilities not only for the company, but also for the customers.

METHOD

Library research for books and literature, related to the topic that will be discussed. Then, doing an interview with related parties in the company, includes the identification of related documents, in order to obtain the image of the ongoing system, and the identification of the needs and the problems that is faced. Then, directly observing the process of procurement, inventory, and sales, that are running now in PT. Interjaya Surya Megah. Designing the database by making the conceptual model, logical model, and physical model. And also, designing the application by making the menu structure, the design of user display, and the transition diagram (STD).

RESULTS AND DISCUSSION

Background of the Company

PT. Interjaya Surya Megah is a company in the field of sparepart machine sales, includes dynamo motor, gearbox, and power generator. PT. Interjaya Surya Megah established on 31 January 1990, which is soon opening a branch in Jakarta, located on Raya Perancis Street 288 Pergudangan Mutiara Kosambi II Bl A-8/25, Benda.

The development of sales in PT. Interjaya Surya Megah was not brief. Here is the history until the rise of PT. Interjaya Surya Megah: In 1990, PT. Interjaya Surya Megah was trusted by Jen Wu Machinery Co., in Taiwan, to be the sole agent of CHENTA Worm Gear and Helical Gear product in Indonesia by selling Brake Merk KEB ex German product. In 1991, PT. Interjaya Surya Megah obtained a sole agency from PE-EI, Taiwan, for Electric Motor products: PE-EI Moger, PE-EI Varibale Speed Pulley, PE-EI Clutch and Brake, and PE-EI Mitter. In 2001, PT. Interjaya Surya Megah obtained a sole agency from MWM Motores Diesel, Brazil, which was then called as MWM International Motores. In 2006, PT. Interjaya Surya Megah then added a new warehouse in the Sinar Gedangan Warehousing Complex, that was located in Sidoarjo; did an expansion by opening a representative office in Manado; and obtained an award from MWM Motores Diesel Engine in Brazil. In 2009, PT. Interjaya Surya Megah opened a representative office in Makasar. In 2010, PT. Interjaya Surya Megah opened a representative office in Semarang. In 2011, PT. Interjaya Surya Megah opened a representative office in Cikupa.

For nearly two decades, PT. Interjaya Surya Megah has been a single roof service resource for various needs of diesel machine, electricity powerhouse, gearbox, electric motor, and any other technical requirements in varied industries. The commitment of PT. Interjaya Surya Megah is to increase high quality products and the best service that made PT. ISM was trusted to be the sole agent from various well-known products from the trusted world's companies. For the company itself, the satisfaction of customers is the main priority; therefore, PT. ISM always keeps our credibility and professionalism, by providing not only product, but also solutions for the need of your power and transmission. From the center office in Surabaya to the branch office in Jakarta, also the representative offices in Manado and Makasar, we are continuously trying to reach consumers by creating distribution networks in big cities in Jawa, Sumatera, Kalimantan, Sulawesi, and Bali.

The growth of the company, demands an information technology support, especially the implementation of web based database application, so it can help the company in running the activities. This web based application is expected to also be able

to help the customers for the transactions with the company, as the benefit that can be obtained from a e-commerce. E-commerce is an approach that is more intelligent for doing businesses, and the best approach for organizations to manage their activities, as part of integrating from their approaches, to develop and maintain the relationship of customers [4].

The ongoing procedures

1. The Procedure of Procurement

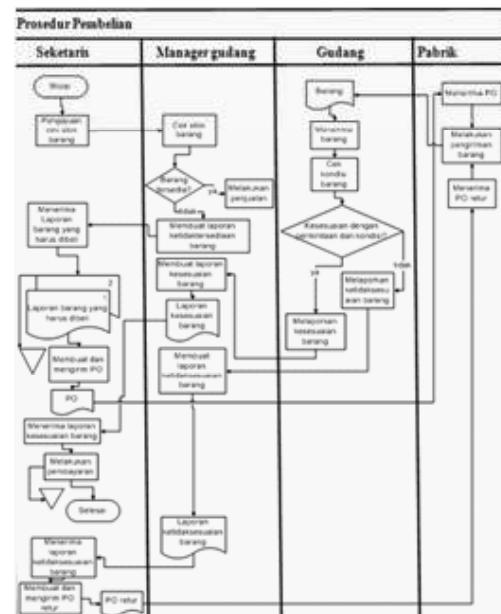


Fig 1: The Procedure of Procurement

Descriptions:

Secretary can ask to check the supply of goods to the warehouse manager.

The Warehouse manager gives a report of the availability and the unavailability of goods in the warehouse. If the goods are available, then the secretary can continue to the process of sales. If the goods are unavailable, then the warehouse manager makes a report of the unavailability of goods.

The secretary obtains a report of unavailable goods supplies, and after that the secretary makes and sends the PO to the factory.

After the factory get the PO, it directly sends the goods to the warehouse, and the warehouse checks the goods' conditions and makes a report to the secretary.

The secretary does the payment, after the goods are accepted.

2. The Procedure of Goods' Inventory Management

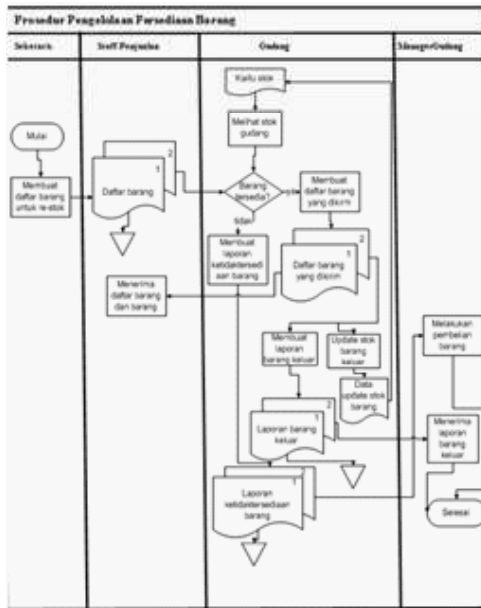


Fig 2: The Procedure of Goods' Inventory Management

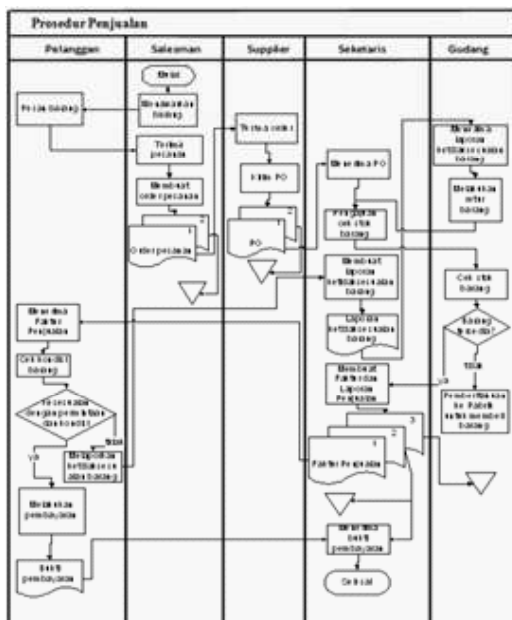


Fig 3: The Procedure of Sales

Descriptions of fig 2:

The secretary makes a list of goods to be restocked for the sales staffs, by looking at the goods which are often bought by the customers or the orders from the customers.

The warehouse staffs checks the goods' supplies, if the goods are unavailable, then the warehouse staffs makes a report of the unavailability of the goods to the warehouse manager, and the warehouse manager makes a purchase of the goods to the factory.

If the goods are available, the warehouse staffs makes a report of the goods, that comes out, that will be sent to the warehouse manager, and then the warehouse staffs will make a report of goods' supplies update that comes out to the warehouse manager.

The warehouse manager obtains a report of the goods that comes out.

Descriptions of fig 3:

The salesman offers the goods to customers. The customers order the goods from the salesman, and after receive their orders, the salesman makes the orders that are sent to the supplier. The supplier send the PO to the secretary. After receiving the orders, the secretary should check the goods' supplies to the warehouse. If the goods are available, the secretary should make an invoice, and send the goods to the customers. If the goods are unavailable, the warehouse will do the purchase from the factory.

After the customers receive sales invoices, then the customers should check the goods' condition whether it is appropriate or not. If it is appropriate, the customers should do the payment and send the proof of payment to the secretary. The secretary receive the proof of payment.

The Problems

The problem, faced by PT HPI Agro in doing the asset management with the running system, are:

Customers are able to buy the goods only if they order the goods through the salesman of directly come to PT. Interjaya Surya Megah, so it takes more time. The difficulties in making the report of the goods' availability, the report of finance, sales, and procurement, are caused by the input of data is still manually done. There is a risk to lose data, if it occurred an error in the input of data, because the recording system is still manual.

Database Design

Conceptual Model

In determining data conceptual model, the things conducted include identification entities, relation of an entity, attributes into the dictionary of data, determine the domain of every attribute entities, and also determine the primary key of every entities. Here follows the explanation of the things in data conceptual model.

The List of Entities

Table 1: The List of Entities

Name of the Entities	Descriptions	Events
Customer	Described the one who performs an order for the transaction of sales to the company	Every customers perform one or more orders of sales
Employee	Described the staffs who work in the company	Each of the employees work for each divisions
Supplier	Described the partner of the company who sell products to the company	Each of the suppliers supply one product or more
Product	Described the products that is sold to the customers	Products can be sold to one or many customers
The Order of Sales	Described the customers' order to the company	Each of the orders can be done to one product or more by a customer
Sales Return	Described the product returns of the sales done by the customers to the company	Each returns of the sales made are based on one sales
The Order of Purchase	Described the company's order to the factory	Each of the orders can be done to one product or more to the factory
Expenditure of Goods	Described the expenses of the goods	Each of the expenditures involve one product or more
Acceptance of Goods	Described the acceptance of the goods	Each of the acceptances involve one product or more

The Relation of Entities

Table 2: The Relation of Entities

Name of the Entities	Multiplicity	Relation	Name of the Entities	Multiplicity
Customer	1..1	Doing	The Order of Sales	1..*
Employee	1..1	Receiving	The Order of Sales	1..*
	1..1	Receiving	Sales Return	1..*
	1..1	Doing	The Order of Purchase	1..*
	1..1	Handling	Acceptance of Goods	1..*
	1..1	Handling	Expenditure of Goods	1..*
Supplier	1..1	Receiving	The Order of Purchase	1..*
Product	1..*	Involved	The Order of Sales	1..*
	1..*	Involved	The Order of Purchase	1..*
	1..*	Involved	Expenditure of Goods	1..*
	1..*	Involved	Acceptance of Goods	1..*
The Order of Sales	1..*	Involves	Product	1..*
	1..1	Underlying	Sales Return	0..*
	1..1	Underlying	Expenditure of Goods	1..*
Sales Return	0..1	Returning	The Order of Sales	1..1
The Order of Purchase	1..*	Involves	Product	1..*
	1..1	Underlying	Acceptance of Goods	1..*
Expenditure of Goods	1..*	Involves	Product	1..*

The List of Attributes

In this stage, all the attributes of each entities are explained, based on its type of data, its length of type of data, possible or not for NULL value, and possible or not for multi value.

The Domain of Attributes

In this stage, the possible values are identified to fill the attribute domain. As an example, for every Ids are using the characters 'A' to 'Z' and numbers '0' to '9'. Meanwhile, for the names and descriptions, it can use space or period.

Determining Primary Key

Table 3: Determining Primary Key

Name of the Entities	Candidate Key	Primary Key
Customer	CustomerID EmployeeID	CustomerID
Employee	SupplierID	SupplierID
Supplier	ProductID	ProdukID
Product	The OrderofSalesID	The OrderofSalesID
The Order of Sales	SalesReturnID	SalesReturnID
Sales Return	TheOrderofPurchaseID	TheOrderofPurchaseID
The Order of Purchase	ExpenditureofGoodsID	ExpenditureofGoodsID
Expenditure of Goods	AcceptanceofGoodsID	AcceptanceofGoodsID
Acceptance of Goods		

From all the stages before, then it is obtained a conceptual Entity Relationship Diagram (ERD), which has been equipped with primary key. Next, from the obtained conceptual data model, the logical data model is made. After the validation is done with the user transaction, ER is obtained as follows:

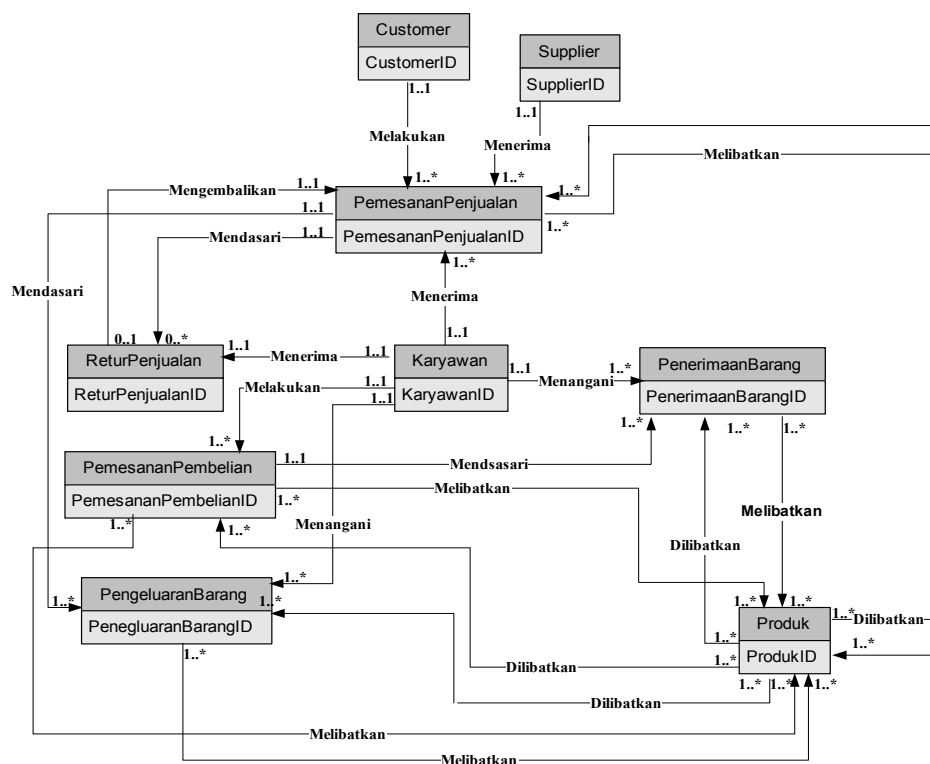


Fig 4: Entity Relationship Diagram

Logical Model

Logical data model is obtained from conceptual data model. The stages that are done in logical model include: Reduce the relationship for logical data model; Validation of the relation by using a normal form/normalization; Validation of the relationship to transaction users; Examine the limit of the integration; Review logical data model with users; Combine the logical data model into global data model; Determine DBMS that is used for the developing application.

After conducting the stages, the obtained ERD is as follow:

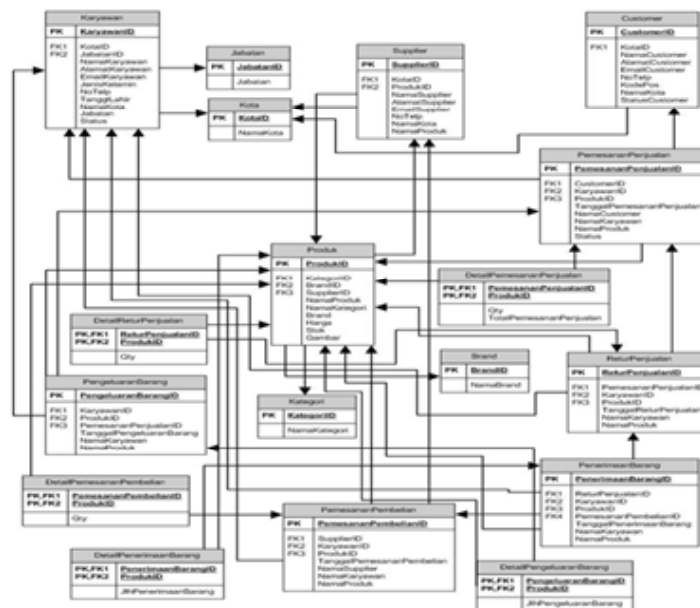


Fig 5: Entity Relationship Diagram

Physical Data Model

In this stage, logical data model, that is obtained back, is processed so the physical data model can be made. The stages of making physical data model include: Determining the base relation design; Determining the general limit; Analyzing transaction; Choosing file organization; Determining the index; Estimating the storage media; Designing safety mechanism .

Determining the Index

To increase the performance of data access, data index that is designed includes the clustered and non-clustered.

Table 4: Data Index

Entities	Index keys	Name of index	Type
Customer	CustomerIndex	CustomerCode	Cluster
Employee	EmployeeIndex	EmployeeCode	Cluster
Supplier	SupplierIndex	SupplierCode	Cluster
Product	ProductIndex	ProductCode	Cluster
City	CityIndex	CityCode	Cluster
Category	CategoryIndex	CategoryCode	Cluster
Brand	BrandIndex	BrandCode	Cluster
Position	PositionIndex	PositionCode	Cluster
Order of Sales	OrderofSalesIndex	OrderofSalesCode	NonCluster
Sales Return	SalesReturnIndex	SalesReturnCode	NonCluster
Order of Purchase	OrderofPurchaseIndex	OrderofPurchaseCode	NonCluster
Expenditure of Goods	ExpenditureofGoodsIndex	ExpenditureofGoodsCode	NonCluster
Acceptance of Goods	AcceptanceofGoodsIndex	AcceptanceofGoodsCode	NonCluster
Order of Sales Detail	OrderofSalesDetailIndex	OrderofSalesCode	NonCluster
Sales Return Detail	SalesReturnDetailIndex	SalesReturnCode	NonCluster
Order of Purchase Detail	OrderofPurchaseDetailIndex	OrderofPurchaseCode	NonCluster
Expenditure of Goods Detail	ExpenditureofGoodsDetailIndex	ExpenditureofGoodsCode	NonCluster
Acceptance of Goods Detail	AcceptanceofGoodsDetailIndex	AcceptanceofGoodsCode	NonCluster
Customer	CustomerIndex	CustomerCode	Cluster
Employee	Employee Index	EmployeeCode	Cluster
Supplier	SupplierIndex	SupplierCode	Cluster

Estimate of Storage Media

For the need of the allocation of data storage media, it is done an estimate based on the attribute's condition and the growth of data. The requirement of all the data storage for one year 7 3 9 4 4 0 b.

The Design of Structure of Application Menu.

Menu Structure

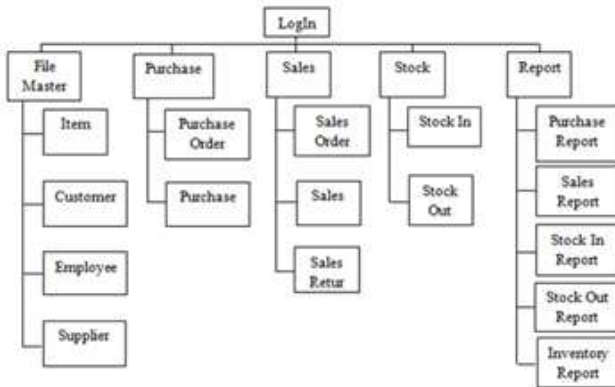


Fig 6: Menu Structure

State Transition Diagram

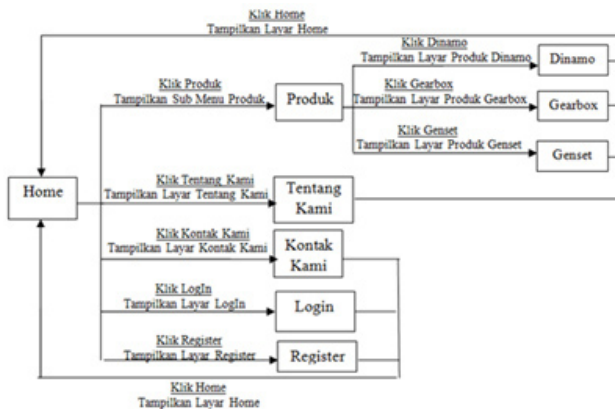


Fig 7: state Transition Diagram

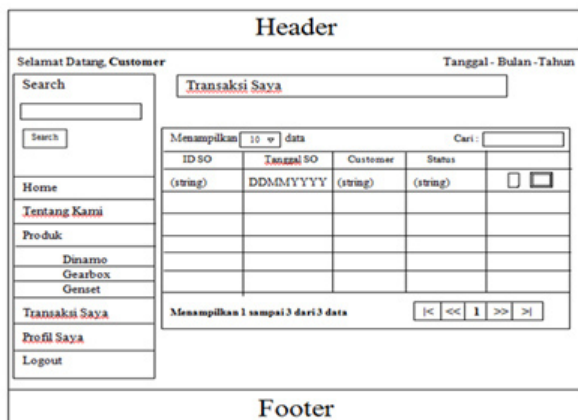


Fig 8: The Design of Transaction Screen

The Display of Result of the Application

Based on the design, a database application is produced, which has the result of the display, as follows:

The Page of Login Screen

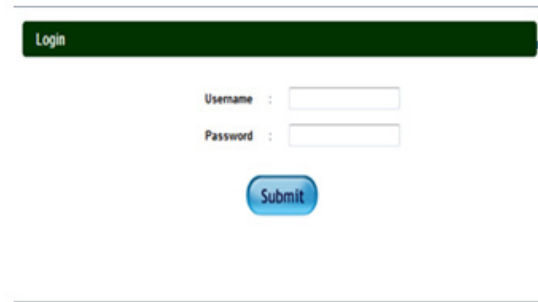


Fig 9: Login Screen

The Page of Transaction Screen

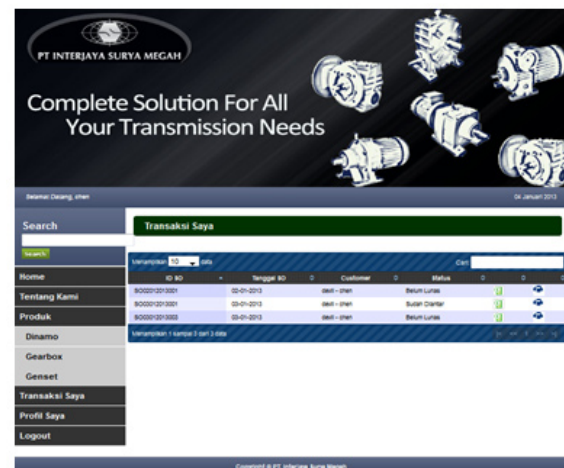


Fig 10: Transaction Screen

The Plan of Implementation

Table 5: Implementation's Plans

No	Activity	Week			
		1	2	3	4
1.	The Preparation of Hardware and Software	X			
2.	Installation		X		
3.	The Conversion of Data			X	
4.	Training for users				X
5.	Users Evaluation				X

The design of implementation at PT. Interjaya Surya Megah is done in the period of time on the figure above. Moreover, the specification of the needed system is determined, includes computer, network, and no forget the personnel, and also the safety that is needed, so that the system can run properly. In the implementation, it is also determined how the process of backup and recovery that is applied on the system.

Evaluation

The evaluation of the database application at PT. Interjaya Surya Megah is running well. There are five criteria that are used in the evaluation, namely: (1) Domain Integrity: the attributes has already been filled based on the domain that is determined in the design; (2) Entity Integrity: there is no primary key that worths NULL, and has duplication on strong entity; (3) Reference Integrity: the attributes has run in accordance with the reference integrity provision; (4) Enterprise Constraint: the limitation of the company is running well; (5) Security: the right of access has been distributed in accordance with the levels of the users.

CONCLUSION

With a database application at PT. Interjaya Surya Megah, it can be concluded that the risk of errors, like the error on processing data, can be reduced. Information retrieval can be obtained faster and more accurate, so the efficient of time and service for the customers increased. The making of the report can be done faster and more accurate. The level of data safety is more secure because only the concerned employees who can access the data. The process of making the report can be easily and quickly obtained.

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